

**MAINTENANCE REVIEW
SECTION REVIEW REPORT**

Purchase Order No: 307945		MDT Division: Butte
Project Description: MacDonald Pass Experimental Striping		Chief: Kevin Brewer
		Superintendent: Kam Wrigg
Review Date: June 20-23,2006		
Review Made By: M. Thomas Roberts		In Company With: Randy Roth
Project Description: This is an experimental project that will utilize three (3) specific manufactures. The manufactures' material will be modified urethane and epoxy. The project is located on P00008E, sign route US-12 beginning at MP 23.2 (west side of MacDonald Pass) and proceeding east ending at MP 30.0.		
Review Type:		
<input type="checkbox"/> Crack Seal <input type="checkbox"/> Overlay <input checked="" type="checkbox"/> Durable Striping <input type="checkbox"/> Seal & Cover		

CONTRACT INFORMATION:

Contractor: Arrow Striping & Mfg, Inc.
Billings, MT

Contract Amount: \$213,184.24

Contract Time/Completion Date: June 30, 2006

SPECIFICATIONS FOR WORK:

Contractor will provide all labor, materials, equipment, traffic control and anything else necessary to apply pavement-marking materials per contract information. The Contractor shall replace the existing stripes in kind unless otherwise directed by the Maintenance Chief. It is highly recommended that a Manufacturer's representative be present when applying their specific material. This is an experimental project. Contractor must apply the specific material to the specific location as listed under the Contract Information Section above. No deviation from this listing will be allowed. Thoroughly clean equipment between applications of different manufacturer's material. Thoroughly clean equipment to include purging of all hoses and nozzles prior to the incorporation and application of different manufacturer's material. Contractor must start the project at MP 23.20 (IPS Modified Urethane) and continue in the sequence provide under "Contract Information".

CONTRACT INFORMATION:

Contractor must apply the material in the sequence listed below. This project is located on **Corridor- C000008, Route - P00008E, Sign Route US-12, and Location Description -Macdonald Pass – Rimini.**

Beg MP	End MP	Material and Supplier	Miles 4” White	Miles 4” Yellow	Yellow Gallons	White Gallons	Words, Symbols & Hash Marks SQ FT	Type of Grind
23.20	25.20	MODIFIED URETHANE - IPS, HPS-4	5.0	4.0	88.0	119.0		GROOVE
25.20	26.20	MODIFIED URETHANE - IPS, HPS-4	2.5	2.0	44.0	55.0		LIGHT
26.20	28.20	MODIFIED URETHANE -EPOPLEX, LS-70	5.0	4.0	88.0	117.0		GROOVE
28.20	29.20	MODIFIED URETHANE -EPOPLEX, LS-70	2.5	2.0	44.0	55.0		LIGHT
29.20	31.20	MODIFIED URETHANE -POLY-CARB, MARK-70.3	5.0	4.0	88.0	110.0		GROOVE
31.20	32.20	MODIFIED URETHANE -POLY-CARB, MARK-70.3	2.5	2.0	44.0	55.0		LIGHT
32.20	33.20	EPOXY – IPS, HPS-3	2.5	2.0	44.0	59.0		GROOVE
33.20	34.20	EPOXY – IPS, HPS-3	2.5	2.0	66.0	61.0	4,374	LIGHT
34.20	35.20	EPOXY – EPOPLEX, LS-50	2.5	2.0	44.0	55.0		GROOVE
35.20	36.20	EPOXY – EPOPLEX, LS-50	2.5	2.0	44.0	55.0		HEAVY
36.20	37.20	EPOXY – POLYCARB, MARK-55.3	2.5	2.0	44.0	55.0		GROOVE
37.20	39.00	EPOXY – POLYCARB, MARK-55.3	4.5	3.6	79.0	99.0		HEAVY

REVIEW OF WORK:

MDT Inspectors: Matt Komac and Marvin Mace (Striping)
 Mike Cote (Surface Preparation)
 Contractor’s Foreman: Jared Kidwell – Striping Crew
 Dennis Nelson – Surface Preparation

Butte Division – MacDonald Pass section was chosen do to the areas snowfall, deicing materials and snowplow activity and proximity to headquarters for monitoring.

The purpose of this work is to evaluate the modified urethane plural component pavement marking material for durability (resistance to weathering and abrasions), color stability (resistance to UV degradation), and retro-reflectivity using MDT specification beads (maximizing visibility and safety for the motoring public) with the current epoxy products being used on MDT’s durable striping program. Evaluations of the products will be for approximately two years.

Grinding requirements for this contract were groove, light, and heavy. Groove grind was required on both the modified urethane pavement marking areas and the epoxy pavement marking areas. A groove and light grind was placed from MP 23.2 to MP 34.2 based on a new seal and cover placed on the project in August of 2005, with temporary waterborne striping applied. Groove and heavy grinding was required from MP34.2 to MP 39.0. The heavy grind required in this section of the contract was done do to having two coats of epoxy already placed on the roadway. Grindings specifications are the following:

- Groove. Groove the surface to ensure that the applied pavement marking is flush with the top of the road surface.
- Heavy. Heavy grinding is defined as complete removal of all pavement markings (entire line) to the top of the pavement surface.

- Light. Light grinding is defined as continuous surface abrasion to the line to establish a roughened surface free of loose paint chips, loose seal aggregate and surface impurities.



Groove grind

The contractor removed all excess grinding material from the roadway surface prior to striping.

Work began on the project June 20, 2006. The contractor's sequence of operation was to use one grind crew and truck, and one striping crew and two striping trucks. It was agreed upon at the pre-construction meeting to allow the contractor to fill one striping truck with the manufactures modified urethane and the second striping truck with the manufactures epoxy (example-IPS Modified Urethane and IPS Epoxy) and stripe those respective areas, clean both striping trucks completely out as specified in the contract and addendum and fill with the next product outlined in the contract. It was highly recommended that a manufacture's representative be present when applying their specific material. The only manufacture representative on the project was Raymond Somich from Poly-Carb. Mr. Somich was present for any help or questions regarding the application of Poly-Carb's modified urethane pavement marking material. The contract was completed on June 21, 2006.

Initial random retro-reflectivity readings were taken by MDT personnel the following day after application of the specified manufactures product using a MX 30 retro-reflectometer. The locations of the readings were marked for future retro-reflectivity monitoring on this project.

TRAFFIC CONTROL:

Contractor used shadow vehicles with TMA’s (Truck-Mounted Attenuators) behind the grind truck and the pavement marking machines. The Contractor placed portable mounted signs on the project to warn the traveling public of wet paint and to stay off the lines. MDT used the variable message sign on the west side of MacDonald pass to inform the traveling public of striping operation on the pass.

PROJECT AVERAGES:

Mil Thickness:

Material & Supplier	Mil - Yellow	Mil – White
Modified Urethane-IPS, HPS-4	21.5	21.5
Modified Urethane-Epoplex, LS-70	22.0	21.7
Modified Urethane-Poly-Carb, Mark-70.3	19.7	22.0
Epoxy-IPS, HPS-3	19.9	22.0
Epoxy-Epoplex, LS-50	21.6	21.7
Epoxy-Poly-Carb, Mark-55.3	21.6	22.0

Initial retro-reflectivity Averages:

Modified Urethane-IPS, HPS-4 MP 23.2 to MP 26.2

Lane	Color	Average
East Bound	White Fog	400
East Bound	White Skip	419
Center Lane	Yellow	281
West Bound	White Skip	419
West Bound	White Fog	413

Modified Urethane-Epoplex, LS-70 MP 26.2 to MP 29.2

Lane	Color	Average
East Bound	White Fog	471
East Bound	White Skip	454
Center Lane	Yellow	323
West Bound	White Skip	461
West Bound	White Fog	449

Modified Urethane-Poly-Carb, Mark-70.3 MP 29.2 to MP 32.2

Lane	Color	Average
East Bound	White Fog	537
East Bound	White Skip	533
Center Lane	Yellow	235*
West Bound	White Skip	535
West Bound	White Fog	526

*Contractor's bead gun was inconsistent in the placement of the beads on Poly-Carbs yellow modified urethane stripe.



**Initial retro-reflectivity Averages (Cont.):
Epoxy-IPS, HPS-3 MP 32.2 to MP 34.2**

Lane	Color	Average
East Bound	White Fog	443
East Bound	White Skip	469
Center Lane	Yellow	299
West Bound	White Skip	457
West Bound	White Fog	456

Epoxy-Epoplex, LS-50 MP 34.2 to MP 36.2

Lane	Color	Average
East Bound	White Fog	400
East Bound	White Skip	419
Center Lane	Yellow	281
West Bound	White Skip	419
West Bound	White Fog	413

Epoxy, Poly-Carb, Mark-55.3 MP 36.2 to MP 39.0

Lane	Color	Average
East Bound	White Fog	391
East Bound	White Skip	418
Center Lane	Yellow	288
West Bound	White Skip	411
West Bound	White Fog	412

Individual retro-reflectivity test location readings are available. Please contact Tom Roberts, Maintenance Review, in Helena (406) 444-6035 or e-mail at troberts@mt.gov.

FOLLOW UP ITEMS:

- Continued retro-reflectivity evaluation
- Field test observations. This will include number of snowplow passes and type and quantity of abrasives and chemicals.
- Appearance and durability will also be monitored.